State of Wisconsin
Department of Natural Resources
Bureau of Watershed Management
Box 7921
Madison, WI 53707

LIFT STATION DESIGN CHECKLIST
Form 3400-168 Rev. 1-98

Note: Use of this form is required by the Department for any new lift-station and/or major modifications plan submittal filed pursuant to s. 281.41, Wis. Stats. The Department will not consider your plan application unless you complete and submit this lift-station request. Manufacturer's drawings and/or specifications reproduced from manufacturer's data and bearing the manufacturers' labels will not be accepted. Personally identifiable information on this form is not intended to be used for any other purpose.

1.Type of Lift Station:

A. What type of lift stations are provided? (check the box that applies)

☐ Wet well/Dry well ☐ Submersible ☐ Suction lift (☐ Self Primed ☐ Vacuum Primed)
☐ Septic Tank Effluent Pump ☐ Pneumatic Ejector ☐ Screw Pump
☐ Grinder Pump ☐ Other (specify)_____

Note: If only simplex grinder/effluent pump stations are provided, skip items 1B through 15, and 17.

B. Are motors and pumps readily removable without entry into the wet well for submersible lift station? ☐ Yes ☐ No ☐ N/A

C. Is the total suction lift 20 feet or less for suction lift pump station? ☐ Yes ☐ No ☐ N/A

2. Design report and calculations:

A. Have a design report and design calculations been submitted? ☐ Yes ☐ No

3. Location:

A. Is the lift station located out of all floodway and/or flood fringe areas; or, is the lift station flood-proofed (two feet above the 100 year elevation or provided with water tight covers)? ☐ Yes ☐ No ☐ N/A

B. Is the lift station located at least 100 feet from private wells or 200 feet from public wells; or if not, has a variance from the Department's Private Water Systems Section and/or Public Water Systems Section been obtained and included with this submittal? ☐ Yes ☐ No

C. Have the force main-well separation distance requirements of ss. NR 811.16 and NR 812.08, Wis. Adm. Code, been met; or if not, has a variance from the Department's Private Water Systems Section and/or Public Water Systems Section been obtained and included with this submittal? ☐ Yes ☐ No

4. Pump Cycle and Detention Time:

A. Is the pump cycle (from on to off and then back to on) with any combination of influent flows and pumping rate at least five minutes or more? ☐ Yes ☐ No

B. Is the total fill time between pump on and off elevations in the wet well at average design flow 30 minutes or less? ☐ Yes ☐ No

5. Wet Well/Dry Well Access:

A. Are there no steps or ladders in the wet well (except for stairways in built-in-place lift stations)? ☐ Yes ☐ N/A

B. Is the dry well (pump chamber) for factory built lift stations less than 20 feet deep, or if more than 20 feet, have provisions for an intermediate landing been provided at approximately mid-depth? ☐ Yes ☐ No ☐ N/A

C. Is the dry well (pump chamber) for built-in-place lift stations provided with both a stairway and an intermediate landing at a vertical interval of less than 12 feet regardless of the depth of the dry well? ☐ Yes ☐ No ☐ N/A

D. If a man lift or elevator is provided in lieu of landing requirements, has an emergency access been included in the design? ☐ Yes ☐ No ☐ N/A

6. Caution Sign:
   A. Is a caution sign provided at top of entrance to wet well? ☐ Yes ☐ No
   B. Does the caution sign read: Caution: Dangerous/hazardous gases. Level 2 Confined space. Do not enter without proper equipment and supervision. ☐ Yes ☐ No

7. Ventilation:
   A. Is wet well vented to the atmosphere using an inverted "j" tube or other means? ☐ Yes ☐ No
   B. Is permanent mechanical ventilation provided for built-in-place lift station where stairways are installed in the wet well for routine entrance to inspect or maintain equipment? ☐ Yes ☐ No ☐ N/A

      If yes, does the permanent mechanical ventilation provide one of the following provisions? (Check the box that applies.) ☐ Yes ☐ No ☐ N/A
      1. ☐ At least 12 complete air changes per hour if ventilation is continuous?
      2. ☐ At least 30 complete air changes per hour if ventilation is intermittent?

   C. Does the permanent mechanical ventilation in dry well provide one of the following provisions? (Check the box that applies.) ☐ Yes ☐ No ☐ N/A
      1. ☐ At least six complete air changes per hour if ventilation is continuous?
      2. ☐ At least 30 complete air changes per hour if intermittent?
      3. ☐ At least 30 complete air changes per hour for the first ten minutes and then automatically switch over to six complete air changes per hour if ventilation is intermittent?
      4. ☐ At least six complete air changes per hour when dry well is occupied and at least two complete air changes per hour when not occupied if ventilation is continuous?

   D. Is the fan wheel made of non-spark materials if wet well is mechanically ventilated? ☐ Yes ☐ No ☐ N/A
   E. Are all permanent wet well and the dry well ventilation systems completely separate? ☐ Yes ☐ No ☐ N/A
   F. Is all permanent intermittently operated ventilation equipment interconnected with the respective wet well or dry well lighting system? ☐ Yes ☐ No ☐ N/A
   G. Is there a manual lighting/ventilation switch provided to override the automatic controls? ☐ Yes ☐ No ☐ N/A

8. Heater/Dehumidifier:
   A. Are automatic heaters and/or dehumidifiers provided in the dry well? ☐ Yes ☐ No ☐ N/A

9. Pumps and Piping:
   A. Are there at least two pumps, each capable of pumping the peak hourly design flow with the largest unit out of service, or if three pumps are used, can the remaining pumps convey the peak hourly design flow with the largest unit out of service? ☐ Yes ☐ No ☐ N/A
   B. If a single pump serving 25 or fewer residential units is used, have provisions been made to add a second pump without requiring structural changes in the future? ☐ Yes ☐ No ☐ N/A
   C. Are pump suction and discharge piping (except grinder/effluent and screw pumps) at least 4-inch in diameter, or if not, has a comminutor or mechanical bar screen or other suitable equipment been provided? ☐ Yes ☐ No ☐ N/A
   D. Is there a running time meter provided for each pump? ☐ Yes ☐ No

10. Valves and Valve Vault

A. Are all valves (except ball check valves which may be located in the wet well provided they can be removed without entering the wet well) located in a dry well or in a separate valve vault that is either an integral part of the lift station or near the lift station? ☐ Yes ☐ No

B. Is the check valve (except ball check valves which may be placed in a vertical run) placed in a horizontal section of the discharge line? ☐ Yes ☐ No

C. Does the valve vault drain to a wet well through a drain line which is equipped with a ball check valve and/or a gate valve and which extends below the low water level to prevent entry of hazardous gases to valve vault? ☐ Yes ☐ No ☐ N/A

11. Force Main:

A. Is a velocity of at least two feet per second maintained in the force main at the design pumping rate? ☐ Yes ☐ No

B. Have the following provisions been made if the force main contains high points? ☐ Yes ☐ No ☐ N/A

Check the box that applies:

☐ combination automatic air release and vacuum valve ☐ an automatic air relief valve
☐ a manual air relief valve ☐ Other (specify) _____

12. Alarms:

A. Does the alarm system activate in cases of power failure, pump failure and at low (if non-explosion proof motors are used for submersible lift station) and high water levels? ☐ Yes ☐ No

B. Does the alarm system also include one of the following provisions or if not, has a written variance from the Department's Bureau of Watershed Management been obtained and included with this submittal to allow a visual and audible (light and horn) alarm system? ☐ Yes ☐ No

(Check the box that applies.)

☐ A radio conveyed system ☐ Automatic telephone dialer system
☐ Telemetered ☐ Other (specify) _____

13. What type of liquid level controls are provided? (Check the box that applies.)

☐ Air bubbler ☐ Pressure transducer ☐ Encapsulated Float ☐ Capacitance probe
☐ Displacement switch ☐ Ultrasonic ☐ Other (specify)_____

Note: If an air bubbler system is used, skip item 14A through 14I.

14. Electrical Equipment:

A. Is a weather proof junction box (for floats) located outside the wet well provided for on the plan sheets? ☐ Yes ☐ No

B. Is another weather proof junction box for submersible pump motor cables located outside the wet well and provided for on the plan sheets? ☐ Yes ☐ No ☐ N/A

C. Are electrical conduits specified as rigid or intermediate metallic conduit (PVC conduit may be used between explosion proof seals and the control panel) and shown on the plan sheets? ☐ Yes ☐ No

D. Is an explosion proof seal provided between the control panel and junction box, and shown on the plan sheets? ☐ Yes ☐ No

E. Is another duct seal or silicon seal provided at the junction box to prevent moisture escaping from the wet well to the junction box and is the seal shown on the plan sheets? ☐ Yes ☐ No

F. Is a redundant low level alarm for submersible pump provided and set such that the pump motor is totally submerged at all times to prevent ignition of explosive gases in the wet well, or is the pump motor rated explosion proof? ☐ Yes ☐ No ☐ N/A

G. Are all motor power cables and all other wiring in the wet well NEC rated SO or STO or better? ☐ Yes ☐ No

H. Are electrical level control circuits using floats/electronic transducers intrinsically safe? ☐ Yes ☐ No

I. Are the floats/transducers suspended in the wet well or mounted on a portable pole to facilitate maintenance? ☐ Yes ☐ No

J. Is a weather proof fused disconnect switch or equivalent circuit breaker provided? ☐ Yes ☐ No

K. Is a 110-volt ground fault circuit interrupter protected duplex receptacle provided at or near the control panel to facilitate maintenance? ☐ Yes ☐ No

15. Duplex Grinder Pump Lift Stations (Also applies to duplex septic tank effluent pumps): ☐ Yes ☐ No ☐ N/A

A. Does the grinder pump lift station serve 12 or less residential units? ☐ Yes ☐ No

B. Is the motor five horsepower or less? ☐ Yes ☐ No

C. What type of grinder pumps are provided? (Check the box that applies.)
☐ Submersible ☐ Nonsubmersible

D. What is the size of pump opening and discharge line?
Please specify: Pump opening _____ Discharge Line _____

16. Simplex Grinder Pump Lift Stations (Also applicable to simplex septic tank effluent pump stations): ☐ Yes ☐ No ☐ N/A

A. Does the grinder pump serve three or less residential units? ☐ Yes ☐ No

B. Is the motor five horsepower or less? ☐ Yes ☐ No

C. What type of grinder pump is provided? (Check the box that applies.)
☐ Submersible ☐ Nonsubmersible

D. Is the grinder pump located out of all floodway and/or flood fringe areas, or is the pump station flood-proofed (2 feet above the 100 year elevation or provided with water tight covers?) ☐ Yes ☐ No ☐ N/A

E. Do the plan sheets show the location of grinder pumps and pressure service laterals? ☐ Yes ☐ No

F. Are the grinder pumps readily removable without entry into the wet well or without dewatering the wet well? ☐ Yes ☐ No

G. Are all valves accessible for operation and maintenance purposes without entry into the wet well or without dewatering the wet well? ☐ Yes ☐ No

H. Is a redundant check valve provided at the pump station if the grinder pump discharges to a common force main? ☐ Yes ☐ No ☐ N/A

I. Is the grinder pump station vented to atmosphere either from the wet well or from the service lateral? ☐ Yes ☐ No

J. Are there no ladder or steps in the wet well? ☐ Yes ☐ N/A

K. What is the size of pump opening and the discharge line?
Please specify: Pump opening _____ Discharge line _____

L. Is the velocity in the discharge line at least 2 feet per second but not more than 5 feet/sec? ☐ Yes ☐ No

M. Is the total dynamic head less than 100 feet? ☐ Yes ☐ No

N. Is a running time meter and hand/off/automatic selector switch provided? ☐ Yes ☐ No

O. Have the pump station-well and force main-well separation distance requirements of ss. NR 811.16 and NR 812.08, Wis. Adm. Code, been met; or if not, has a variance from the Department's Private Water Systems Section and/or Public Water Systems Section been obtained and included with this submittal? ☐ Yes ☐ No ☐ N/A

P. Are audible and visual high water alarms provided? ☐ Yes ☐ No

Q. Is the control panel located outside the wet well? ☐ Yes ☐ No

R. Are two weather proof junction boxes (one for floats and the other for the submersible pump motor) provided, located outside the wet well, and shown on the plan sheet? ☐ Yes ☐ No ☐ N/A

S. Are level controls including low and high water alarm circuits provided with low voltage not to exceed 24 volts? ☐ Yes ☐ No ☐ N/A

T. Is an explosion proof seal provided between the junction box and the control panel and shown on the plan sheet? ☐ Yes ☐ No ☐ N/A

U. Are all cables in the wet well NEC rated for "extra hard use in damp locations"? ☐ Yes ☐ No ☐ N/A

V. Are there separate conduits for pump and control circuits? ☐ Yes ☐ No ☐ N/A

W. For submersible pumps, is the redundant low level alarm provided and set such that the pump motor is totally submerged at all times, or if not, is the pump motor rated explosion proof? ☐ Yes ☐ No ☐ N/A

X. For nonsubmersible pumps, is the weather proof motor completely isolated from wet well atmosphere in a separate gas tight housing? ☐ Yes ☐ No ☐ N/A

17. Emergency operation for each lift station including duplex grinder/effluent pump lift station:

A. Will emergency operation be provided during a power failure? How? (Check the box that applies.) ☐ Yes ☐ No

☐ On-site generator
☐ A portable generator of adequate capacity
☐ A portable pump of adequate capacity
☐ On-site gasoline or diesel driven engine
☐ Two independent electrical transmission routes
☐ Holding capacity to hold minimum 24 hours based on average flow

B. If a portable generator or a portable pump serves more than three lift stations, has a written variance from the Department's Bureau of Watershed Management been obtained and submitted? ☐ Yes ☐ No ☐ N/A

C. If portable pump is used for emergency operation, have quick disconnect fittings/couplings (accessible without entering the lift station and/or valve manhole) been provided to the suction and/or discharge line? ☐ Yes ☐ No ☐ N/A

To the best of my knowledge and belief, the above information is true, complete and correct.

_____
Signature of Consulting or Municipal Engineer Responsible for Preparing This Form

_____ _____
Date Signed Wisconsin P.E. Number